

Automated Identity Verification using Robotic System for Library

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Abstract— The main objective of this system is to develop an embedded system, which will provide better service at input as well as output of library, in more elaborate form you have to just select the book at book issue counter book will come automatically to your end. This would reduce the user efforts and save time. In this project we will implement practical knowledge of mechanical engineering. The goal of this project, library automation is to automatically issue books and important fact is that it provides security against theft.

Keywords: Robotic Arm, DC Motor, Arduino-Uno, RFID Reader

I. INTRODUCTION

Robotics is a key technology in the modern world. Robots have taken their first steps into homes and hospitals, and have seen spectacular success in planetary exploration. In this project the RFID technology is used. It is mainly focused on the book detection and reducing the human work. Robot technology has been widely deployed into various applications to improve productivity. Inventory tracking is a tedious but important process for inventory management.

In particular, a library easily contains hundreds of thousands of books that are frequently borrowed and returned back to the shelves. To facilitate users to easily locate a particular book, books are placed in dedicated areas and sorted in a running sequence based on their so-called call numbers. Library staffs have to ensure that the books are placed in order, an extremely labor intensive and time consuming process. Library staffs first need to perform shelf reading, i.e., manually search for books that are misplaced in the wrong book sequence, then pick up the book and insert it in the correct location. Typically they have to pick the books and hand it over to the person to whom the books are being issued.

This might be an easy task in case the library floor area is small. Also, to search for the books by humans takes a lot of time as many a times the books gets overlooked by the human eye. To automate this process of book finding and picking we suggest a robot which will be able to find out the book with the required tag and then bring it to the desk. i.e.; what we are working towards here, is an autonomous robot that will help a library user to find a book and retrieve it from the shelf.

II. LITERATURE SURVEY

In older days libraries required more manual power to manage. In particular, a library easily contains hundreds of thousands of books that are frequently borrowed and returned back to the shelves. Typically we need a librarian to pick the book and hand it over to the person to whom the books are being issued. This might be an easy task in case of the library are is small. Also, to search for the books by humans takes a lot of time as many a time the books get over looked by the human eye.

That is running of library manually is a difficult task. It is time consuming and laborious. We can overcome these

drawbacks through our project. In this project we are going to maintain and autonomous service robotic assistant whose functionality includes the assistance of individuals with in a library environment. The evolution of robotics started in twenty first century.

We referred there innovation: focused on the books

[1] Deepthi Unnikrishnan, Aswani C R: "Library Assistant Robot" International Journal of Engineering Research and Technology (IJERT), ISSN, 2268-0181, Volume.6 issue 01:

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[2] Corina Monica Pop*, Gheroghe Leonte Mogan*: "Robotic grippers for handling books libraries" International Conference of Scientific Paper Afases 2015, Brasov:

Robots that are designed to perform specific tasks are relatively rare. In this case a mobile robot arm is used to manipulate the books on a shelf. This paper describes the most relevant performances of prototypes design for robotic manipulation of book material. Currently, very active researches are conducted in the field of service robots as results from the programmers of the most international conferences on robotics. However, robots that are design to perform specific library tasks are relatively rare. In this case a robotic arm is used to manipulate books on a shelf [5].

The issue of object manipulation is solved by using standards well known geometries of articulated arms that can satisfied a wide area of conditions. Considering the above the problem of book manipulation can be approached like a standard manipulation problem. The robotic unit is design to simulate the human approach. When a book is correctly positioned into its shelf the only accessible surface is the back of the book [6].

[3] N. Arun Ram Kumar, M.Elango: " Robotic arm based library automation using Haptic technology" International Journal of Computer Science Engineering (IJCSE), vol.3 issue.02:

The project focuses on picking the object with automated robotic arm like structure with a clamp. On the arm is then fitted on a movable chasses so that it can be moved over various locations. The object is thus sensed using RFID reader hence it is mainly designed for the library. The height of the arm can be moved up to 56cm from the ground and thus the clamp can rotate according to the direction of book place in the rack. The main purpose of this arm is to reduce human work and also accuracy. The movement of the arm is done using the crank like structure which is used for the lifting the arm up and down. And a separate DC geared motors are thus used for rotation of the arm around a 360 degrees rotation and hence as the rod rotates and hence a clamp which is fitted at the edge of the rod and hence clamp which is used for picking the object and which has an motor for rotating the clamp and hence this are sum of the basic operation of the arm and hence for movement of the arm through the various locations the arm is placed over the chassis and hence this are the basic modes of operations of the arm. Then the wheels at the four ends of the chassis are thus controlled using the DC motors and a wooden plywood is covered at the top of the chassis and hence over which the crank is thus placed and hence the crank is in the cross shaped and over which the arm is thus placed

III. PROPOSED METHODOLOGY

When we enter in the library the RFID tag is used as an identification card of a student. The RFID reader reads the information from the tag and it is decided whether the student is valid or not. If student is invalid he/she is not able to issue any book. Then we have to enter the number of book which we want to issue. The input is give through the switch. This information provides to the microcontroller/ arduino. According to the information motor is moved and because of motor movement whole robotic structure is moved. This information is sent to the microcontroller / arduino again send this information to the motor through motor driver IC L293D. we used two LDR sensor and robot stops. Firstly robot senses the shelf by LDR sensor and robot stops. After that shelf LDR sensor senses the robot then the conveyor starts moving and the book on it also moves forward and falls into the basket on the robot. This process is completed within 10 sec. after 10sec robot starts moving towards the counter and handovers the book.

A. Block Diagram

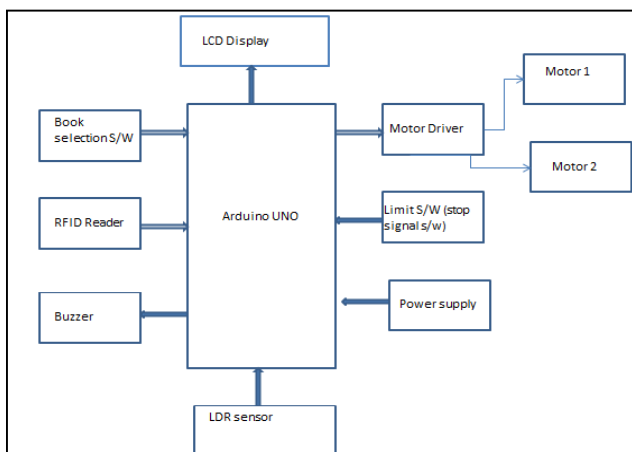


Fig. 1: Block Diagram of Proposed system

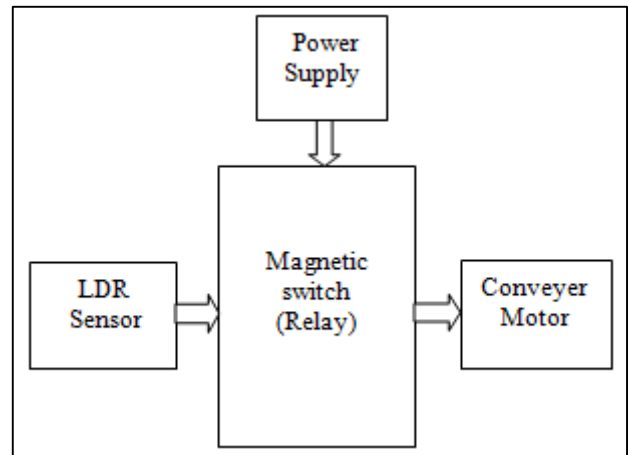
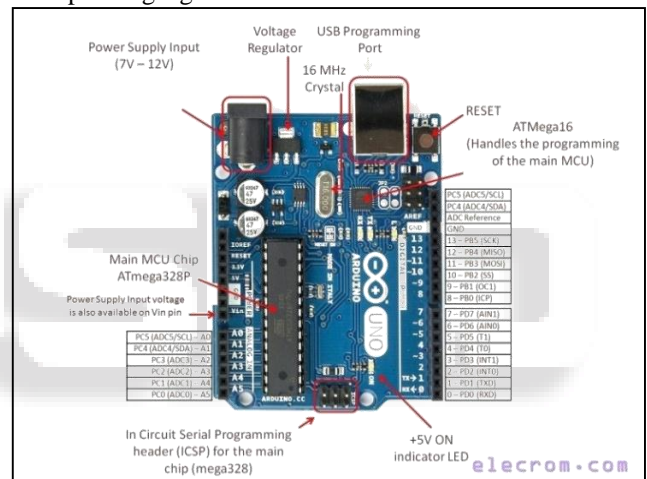


Fig. 2: Block diagram of shelf system

B. Elements of Block Diagram:

1) Arduino:

Arduino MEGA is the main controller in the project. The data from the IR Sensors will be given to Arduino and it gives corresponding signals to the Motor Driver IC



2) Motor Driver (L293D):

L293D Motor Driver IC is utilized as a part of this undertaking to drive the motor of the robot. IR sensor provides information to arduino and then to Motor Driver IC

3) RFID Module:

A Radio frequency identification reader is a device used to gather information from RFID tag, which is used to track individual objects. Radio waves are used to transfer data from tag to reader

4) LCD (Liquid-crystal display):

Liquid crystal display according to its name only it is combination of two states of matter, liquid and solid, LCD uses liquid crystal to produce visible image.

5) Buzzer:

A buzzer or a beeper is a audio signaling device, which may be mechanical electromechanical, or piezoelectric. In our project it is a piezo buzzer, basically a tiny speaker that we can connect directly to the Arduino. Connecting one pin to the arduino's ground and the other to the end of digital pin8.

6) Limit switch (stop signal switch):

We use limit switch or it also called as stop signal switch to stop the robot when operation will be done.

7) *Book selection switch:*

Book selection switch is used to enter the book number or also used to enter the book name. as per our assembly we can change our keys. Keys replaced by keypad or also replaced by digital keypad

8) *Dc Motor:*

In this project we use three DC motor. 1st two are used to drive the robotic vehicles. it having 12 v and 45 RPM. And 3rd are used to drive the conveyer. It having 12v and 100 RPM.

9) *Conveyor motor:*

It is used to convey the book and put it into the basket. Basket fit on the robotic vehicle.

10) *LDR Sensors:*

An LDR is a component that has a resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. Two LDR sensors are used in our project one for sensing the robot and other for sensing the rack.

IV. RESULT

Initially we are at the home position .The required book's number is given as the input to the keypad. The Number of the particular book will get displayed on the LCD. Then the robot starts moving towards the shelf. It takes the book from the shelf with the help of conveyer used in shelf. The robot takes the book in his basket and move towards the destination. It stops when the limit switch the robot is pressed.

V. CONCLUSION

In this system the robot is using arduino to carry books more safely without incurring much damage to the destination. We also used the conveyor to slide the book from shelf to the basket of the robot which is placed on the robot. By the use of this project the operations can be done easily and safely in a short span of time.

There are several future recommendations that should be considered. As in robots is developing quickly now a days we can make robot more sufficient and modern. .Also we can build up this framework with ongoing camera execution. This project can be further implemented in shopping malls glossary shops.

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